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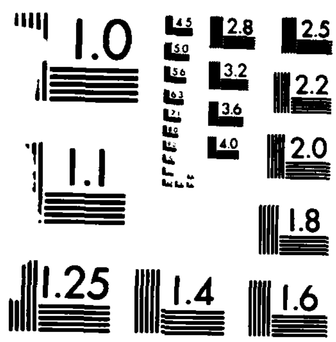

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THESIS

ALTERNATIVE SURFACE WARFARE OFFICER CAREER PATHS AND THEIR POTENTIAL FOR REDUCING PERMANENT CHANGE OF STATION COSTS

by

Nicholas F. Mygas

December 1985

Thesis Advisor: P. R. Milch

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—This thesis presents and analyzes several alternative surface warfare officer (SWO) career paths. The paths are designed to reduce permanent change of station (PCS) costs by reducing the number of PCS moves in an officer's career while meeting sea billet requirements, minimizing turbulence within the SWO community and maintaining a viable career path for the officer. The reduction in the number of moves is primarily accomplished through the extension of tour lengths or greater use of homesteading. The analysis is accomplished on a personal computer with software constructed in an earlier Naval Postgraduate School thesis. The analysis is directed at determining feasibility of the career paths presented and where applicable identifies the number of PCS moves eliminated.

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Alternative Surface Warfare Officer Career Paths and Their Potential for Reducing Permanent Change of Station Costs

by

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Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

This thesis presents and analyzes several alternative surface warfare officer (SWO) career paths. The paths are designed to reduce permanent change of station (PCS) costs by reducing the number of PCS moves in an officer's career while meeting sea billet requirements, minimizing turbulence within the SWO community and maintaining a viable career path for the officer. The reduction in the number of moves is primarily accomplished through the extension of tour lengths or greater use of homesteading. The analysis is accomplished on a personal computer with software constructed in an earlier Naval Postgraduate School thesis. The analysis is directed at determining feasibility of the career paths presented and where applicable identifies the number of PCS moves eliminated.

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I. INTRODUCTION

A. BACKGROUND

> The Surface Warfare Community is composed of officers who are qualified in the surface warfare specialty, who man the surface ships of the Navy and whose goal is to command those ships. The Surface Warfare Officer (SWO) must, through a progression of competitive assignments, learn the fundamentals of engineering, weapons systems, and operational tactics. [Ref. 1: p. 23]

The above quotation from the Unrestricted Line Officer (URL) Career Planning Guidebook summarizes the goal of every Surface Warfare Officer. For an officer to acquire the requisite knowledge and skills required for command at sea he must serve in a variety of billets during his career. This sequence of billets or career path must afford the officer the opportunity to hone his leadership and surface warfare skills that will enable him ultimately to take command. Due to all the variables involved in the process there is no one path to command. Furthermore, not all who aspire are chosen for only the best are selected. Since there are so many paths to command there is some benefit in identifying some alternative SWO career paths that not only provide an opportunity for command at sea but might also benefit the Navy in other areas as well. Specifically, career paths that reduce the number of PCS moves each fiscal year and result in the saving of PCS funds will be discussed.

B. PERMANENT CHANGE OF STATION

The need to meet sea billet requirements and to give officers the experience and background to command a ship necessitates that officers be moved. These permanent change of station (PCS) moves are costly to not only the Navy but the individual as well. An air force study completed in fiscal year 1982, that was included in the PCS study conducted by the Office of the Assistant Secretary of Defense (MRA&L), revealed that the government reimbursed one out of every three dollars an officer or enlisted personnel spends on a PCS move [Ref. 2: p. 103]. Although the survey was conducted on air force officer and enlisted personnel the results would probably be similar for Navy personnel. Because of these costs to the Navy and the individual, the Navy has been trying to reduce for the past several years the number of PCS moves made. Some of the methods implemented to obtain the reduction, such as increased geographical stability and reduced pipeline training, were brought out in the Permanent Change of Station (PCS) Study of September 1983 [Ref. 2: p. 98]. Some of the methods mentioned in that study are illustrated or expanded in this work and potential PCS savings calculated.

When attempting to identify potential PCS savings three of the six types of PCS moves were considered. They are rotational, operational and training moves. As defined in the PCS Study:

> Rotational moves occur when individuals travel across the ocean to move to or from a permanent overseas duty station. However, not all moves that involve transoceanic travel are rotational moves. There are accessions to overseas, separations from overseas, and some unit moves to and from overseas.

Operational moves occur when individuals transfer within the same theater from one PCS duty station to another with no transoceanic travel involved. Although operational moves are predominantly moves from one location in the continental United States (CONUS) to another CONUS location, moves within Europe are also operational moves.

Training moves occur when individuals move to or from a training school to attend a formal course for 20 weeks or more, except for those moves involving transoceanic travel. In this case, the move is considered a rotational move. [Ref. 2: p. 4]

These type of moves are considered because they are controllable in the sense that they are driven by policy. The other three types of PCS moves, accessions, separations and unit moves, are mandatory and therefore are considered uncontrollable.

C. FRAMEWORK

The foundation for this work was laid in December of 1984 by R. H. Howe in his thesis entitled The Effect of PCS Policy Changes on the Surface Warfare Officer (SWO) Career Developments. [Ref. 3] In his work Howe developed a network representation of SWO career paths. It consisted of an 8 x 12 matrix, with the 8 rows depicting activities and the 12 columns tour sequences. The network provides a framework for illustrating the various SWO career paths for any path in existence and for any future paths that might be conceived. Howe provided seven basic career pathways that could be used to illustrate and summarize the majority of the SWO career paths. Figure 1.1 is a an example of one of these pathways, in this case a SWO major command career path.

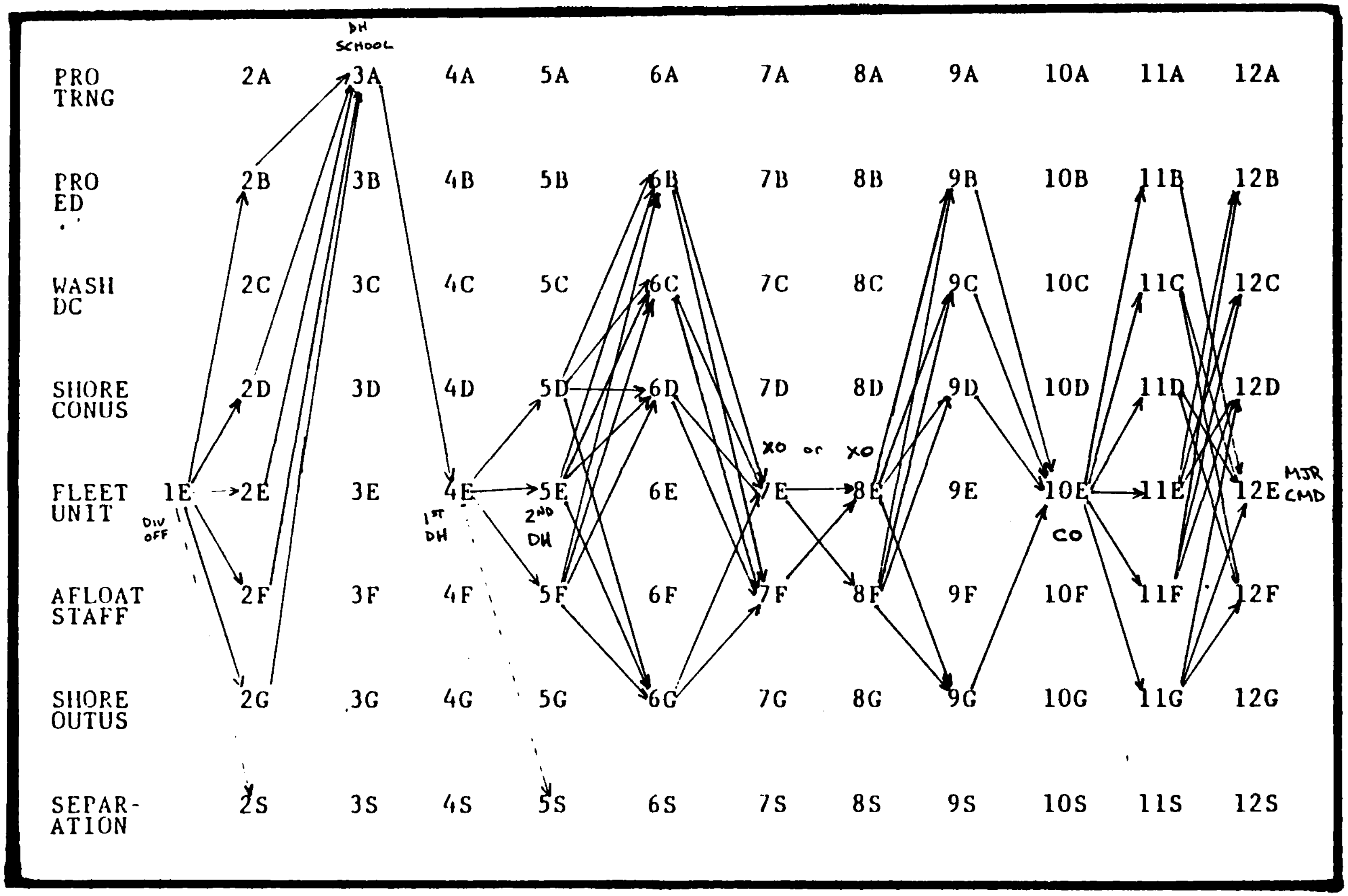

Figure 1.1 Network Representation of a SWO Major Command Career Path

Howe's work was used as the background for the SWOPATH model completed in September 1985 by R. B. Amirault in his thesis entitled SWOPATH: An Interactive Network Flow Model Simulating the U.S. Navy Surface Warfare Officer Career Paths. [Ref. 4] SWOPATH is a computer program written in Turbo Pascal designed for use with the Heath/Zenith models 100/110/120 micro computer or an IBM PC compatible micro computer. The model simulates the SWO career path as it currently exists in order that analysis can quickly be done on proposed changes to the career path. In the model the user can change a multitude of the factors involved such as the number of accessions, tour lengths, transfer path percentages and others. This change feature of the model allows the user to hypothesize almost limitlessly with the SWO career path and see what impact the changes might have. The analyst can quickly see if sea duty billets are vacant, if department head school has too many officers assigned or if some other problem has risen. He can then utilize the model to determine what way the problem can be corrected.

TABLE I

TOUR ACTIVITY DEFINITIONS

A-- Professional Training - Student billets in either the SWO Department Head or SWO (Basic) courses longer than 20 weeks.

B-- Professional Education - Student billets at a postgraduate school or a war or staff college of duration longer than 20 weeks.

C-- Washington DC Tour - Shore duty billets in the Washington metropolitan area not meeting any of the criteria in A or B above.

D-- Shore (CONUS) - Shore duty billets within the continental United States not meeting the criteria in A, B, or C above.

E-- Fleet Unit - Ship's company sea duty billets.

F-- Afloat Staff - Afloat staff sea duty billets.

G-- Shore (OUTUS) - Non-CONUS shore duty billets.

H-- Separation - Loss of officers to the SWO community.

[Ref. 4: p. 17]

Several of the features of the SWOPATH model will be used and referred to repeatedly in the course of this work. These frequently used features are covered in detail in Amirault's work [Ref. 4] and only a short summary is included here for the purpose of orientation. The term node refers to an assignment or tour in the network which is designated by a number in the sequence of tours of a SWO and a letter that stands for one of seven types of activities listed in Table I. The node for initial sea duty for example is designated tour 1E, whereas the node for commander command is designated 10E. The number of officers presently at each node in the model will be referred to as the "current nodes." The transfer path percentages are the rates at which officers are transferred from one node to another. For example, the transfer path percentage from tour 1E to tour 2D is 24 percent. The transfer paths to the H nodes are the separation rates which are the rates at which officers leave the

SWO community from each assignment. Additionally, low and high limits on the number officers assigned to each node may be specified by the user. Low limits when violated while running the model warn the user that too few officers are at a particular tour. Running the model in this and all cases refers to having the model conduct calculations for a particular number of years and quarters designated by the user. The low limit feature of the model will be used to signify billet requirements for sea duty and afloat staff tours. They will be set to determine the feasibility of a change. A feature called reinitialization allows the user to 'start over' without actually having to do so. For example, it allows the user to run the model with the initial number of officers at each node even though calculations have previously been done for five years. The user can also reinitialize the year and quarter counter that keeps track of time while running the model. This lets the user restart the counter after a change to the model or after a number of years of calculations have been completed.

The change feature of the model allows the user to alter the number of accessions, transfer path percentages, tour lengths, and high or low limits. The change selection screen is depicted in Table II. In order to use the change feature the user selects that option from the selection menu and then follows the prompts in the program. The change feature allows the user the choice of saving the changes permanently in a file named by the user, to change the data in the model permanently or to use the changes for

TABLE II

SWOPATH MODEL CHANGE SCREEN

Which data do you desire to change?

Input data	Data file
0. No changes/finished changes.	
1. Number of officer accessions.	
2. Transfer path percentages:	Arcs
3. Assignment tour lengths:	Length
4. High limits:	Hilimit
5. Low limits:	Lolimit

Type your selection [0,1,2,3,4,5]:

only that session at the terminal. To change the default nodes data in the model there is a separate Update program.

For steady state analysis a steady state file has been created. This was accomplished by running the model for 30 years as it presently exists with an accession rate of 340 thereby yielding nodes data labeled the "STEADY30" nodes file. This file was saved under the above name, and will be referred to later in the text.

Although an analyst should be familiar with both Howe's and Amirault's theses, an in depth understanding of them is not required as the model was designed to be and is user friendly.

D. OBJECTIVES

The objective of this thesis is to use Howe's networking scheme to illustrate new or alternative SWO career paths that might save PCS funds and to analyze with Amirault's SWOPATH model the effects these changes might have on the SWO career path and community. A requirement of the career path alternatives presented is that they should minimize turbulence within the SWO community in order to maximize reception of the change within the SWO community. Through the use of the model the feasibility of each alternative career path can be determined and the number of potential PCS moves saved by fiscal year enumerated. Although no monetary savings are computed here, the number of PCS moves saved could be multiplied by a standard cost for the type of moves

saved and a potential amount of PCS funds saved thus identified. This multiplication is left to the reader who should have the timely and applicable rates available.

A constraint placed on the formulation of most new or alternative career paths is that they be viable and lead to an opportunity for command. Without that the SWO career path becomes undermined in the sense that a career path with no specific goal to achieve will not attract the quality and quantity of officers needed to command the surface fleet.

However, there are some policy changes discussed in Chapter III that do not deal with command. These policy changes are concerned with individuals who have had successful careers and identify PCS savings while these officers serve out their career.

E. DATA

The data in the SWOPATH model when completed by Amirault was only a rough approximation of the real world as he had no real data available to him at the time. Actual data on surface warfare officers has been obtained from the Deputy Chief of Naval Operations, (OP-130E40C), in two parts. The first part is a current inventory file and contains the last three duty stations as well as the last three schools of all Surface Warfare Officers in the Navy as of October 1985. The second part is a separation file and contains the last school and duty station from which the officer was separated from the service during a period covering

the end of 1983 to the middle of 1985. Samples of each data file are contained in Appendixes A and B.

Both sets of data were coded based o the nodes of Howe's major command career path, (as depicted in Figure 1.1), and the standard SWO career path as illustrated in Figure 1.2. [Ref. 5: p. 4] During the coding procedure allowances were made for officers who didn't follow the 'standard' career path sequence. For example, although tour 3A is designated as the department head school tour in Figure 1.1 not all officers attend the school as their third tour. Some officers attended department head school as their second or fourth tour and were coded as such.

Only data on 1110 (regular Navy) and 1115 (reserve) Surface Warfare designated officers with continuous active service was coded. Officers who had service broken by inactive duty time or who are designated as 1117 (Training and Administration of Reserves) were not included because it was felt that the uniqueness of their career path might detract from the worth of the final results.

The coded data was analyzed with a computer statistical package (SAS)*, to obtain transfer path percentages and separation rates. A sample of this data can be found in Appendix C. The transfer paths in the model were then updated using the change feature of the model The Update program provided with the SWOPATH model was utilized to change the nodes data.

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*SAS Institute Incorporated, SAS Circle, P.O. Box 8000, Cary, North Carolina 27511-8000.

The SWOTOURS model developed by W. D. Ferree [Ref. 6] was used to obtain billet data for the purpose of setting low limits for the nodes representing sea tours. The data is contained in Appendix D. Although this data is believed to be quite accurate it should be updated whenever the SWOTOURS model is used.

F. METHODOLOGY

The methodology and format utilized to analyze the career path alternatives presented in this work will be as follows:

1. present the alternative career path;
2. discuss the strengths and weaknesses of the change;
3. delineate steps for implementing the change on the model;
4. run the model, evaluate the feasibility of the change and when applicable tally the potential number of PCS moves eliminated.

The analysis will first be run with current data which is the data previously entered into the model. It will then be run for a steady state example using the "STEADY30" nodes file. When conducting steady state analysis with low limits the purpose will be to see if the limits are violated, if so for how long and to determine when the model will again be in or near steady state.

In addition to the changes to the SWOPATH model made previously three more changes were made to the model when running the examples in this thesis. The changes are to set the length of tours 2A and 6A to two quarters and to set accessions at 340.

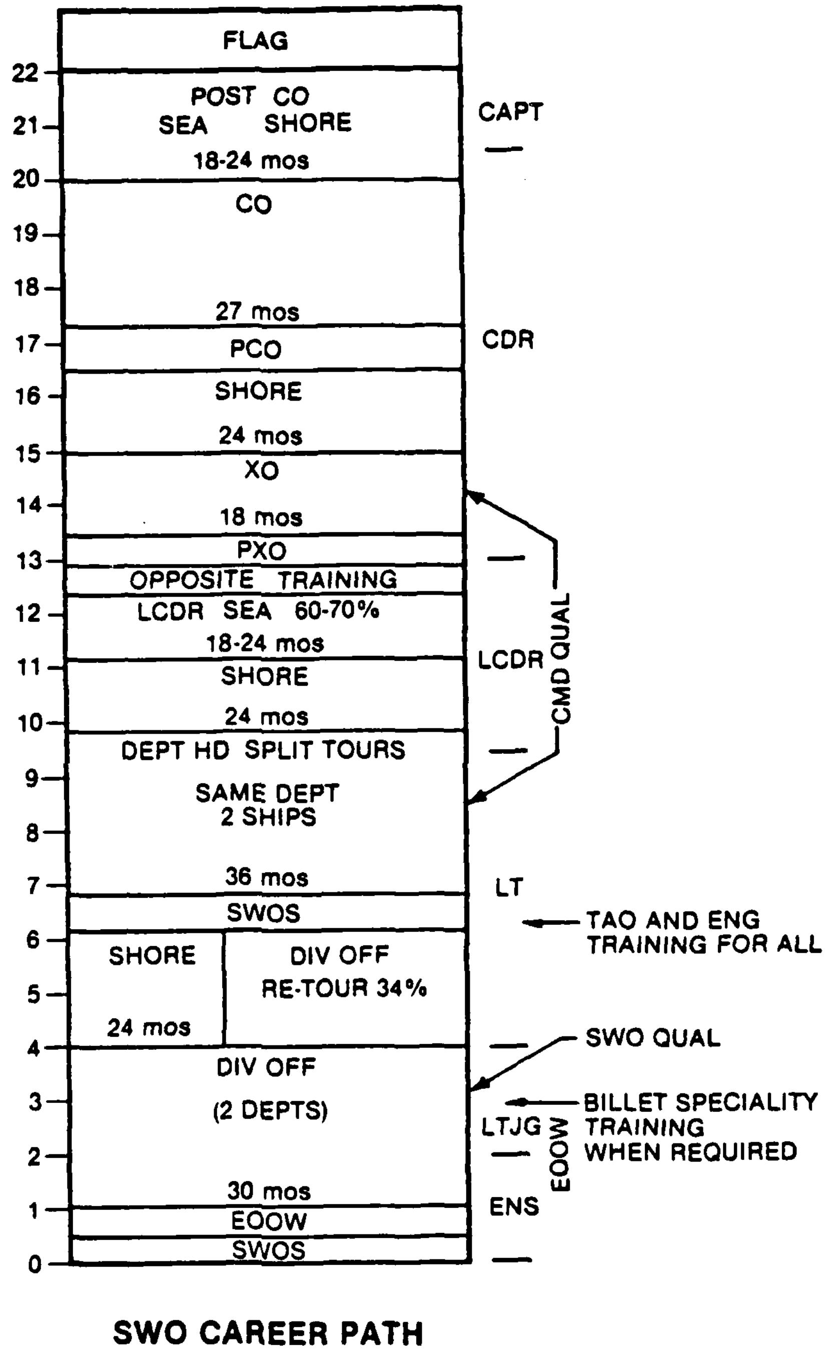

Figure 1.2 . Surface Warfare Officer Career Path

II. ALTERNATIVE SURFACE WARFARE OFFICER CAREER PATHS

One of the primary purposes of this work is to demonstrate with the SWOPATH model the affects that any career path change might have on the surface warfare community. Toward that end several alternative career paths have been created as examples to demonstrate the model. The first example alters the early portion of the career path by having an increased number of officers serve their department head tours earlier in their career than is current policy. A second example examines changes later in the career path by examining the possibility of either extending or allowing a second commander command tour for a limited percentage of officers. A third alternative briefly evaluates the effects of lengthening of the initial sea tour and finally an example will be presented for the sole purpose of demonstrating how a thorough change to the career path could be evaluated by the model.

A. EARLY DEPARTMENT HEAD

In his thesis Howe identified what he called an early department head path [Ref. 3: p. 99]. This path has an officer serving his department head tour right after his initial sea duty tour instead of going to shore duty. In terms of the model the officer will serve his department head tour during tour 3E instead of tour 4E as he normally would. Three versions of alternative career paths focusing on the early department head

option will be presented. They will consist of the original path formulated by Howe and some additional paths that are variations of the original. All variations of this alternative career path will be presented together with their collective and individual strengths and weaknesses delineated. Having explained the variations being examined an example of how to implement one of the paths on the model will be given. Once demonstrated with one variation the others can easily be implemented by any user of the model.

1. Early Department Head Path Descriptions

Early department head path I is depicted in Figure 2.1 with the tours explained as follows:

Tour 1E - Initial sea duty tour,

Tour 2A - Department head school,

Tour 3E - First department head tour,

Tours 4E and 4F - Second department head tour,

Tour 5B - Postgraduate School,

Tour 6C and 6D - First utilization tour,

Tours 7E and 7F - LCDR sea tour,

Tour 8E - Executive officer tour,

Tours 9C and 9D - Second utilization tour,

Tour 10E - Commander command tour.

Note that the first three tours are the same each variation of the early department head career path and that at the commander command tour the early department head career paths rejoin the original career paths.

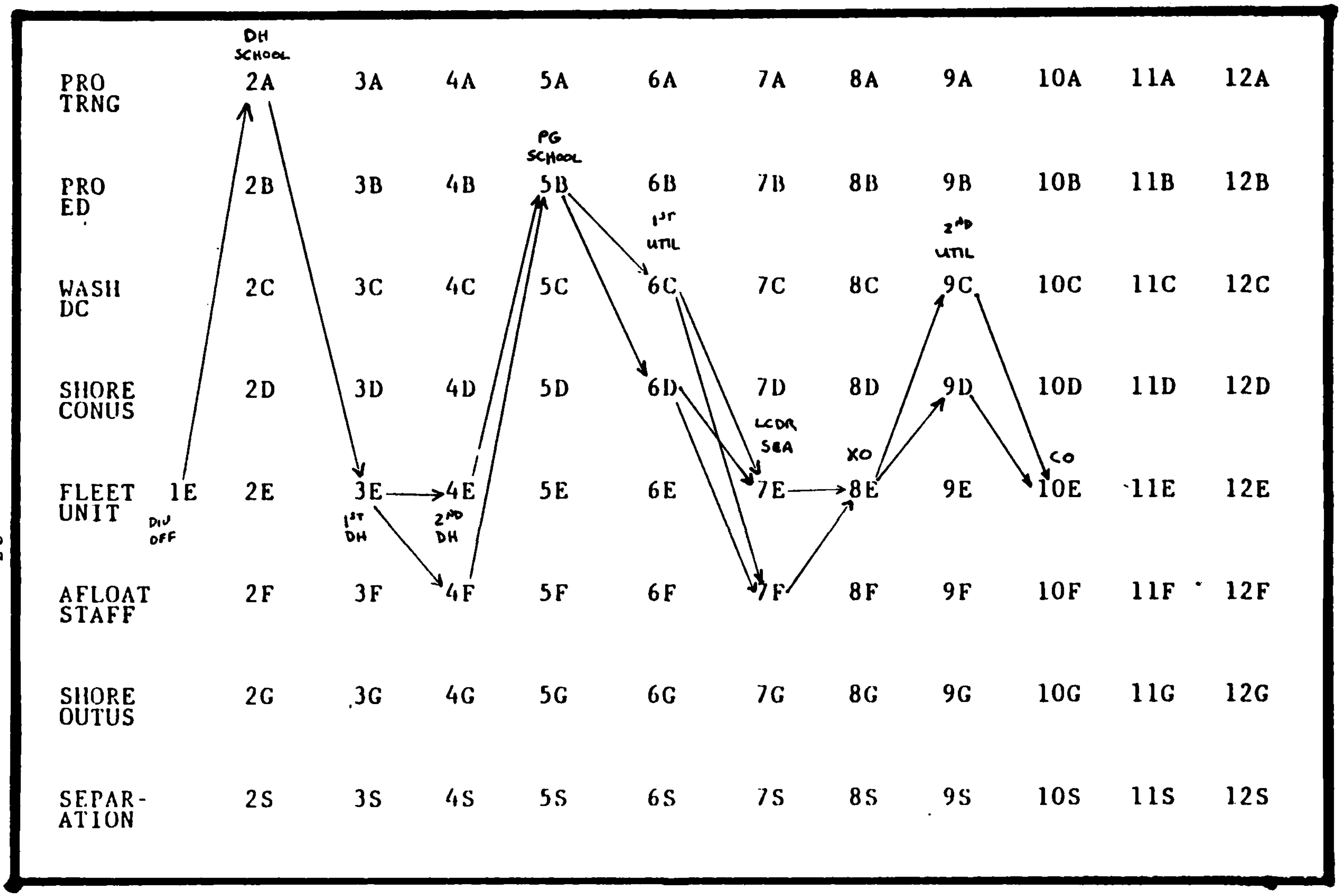

Figure 2.1 Network Representation of an Early Deparment Head Path I

Early department head path II is depicted in Figure 2.2 with the tours explained as follows:

Tours 1E, 2A and 3E as in path I.

Tour 4B - Postgraduate School,

Tours 5E and 5F - Second department head tour,

Tours 6E and 6F - LCDR sea tour,

Tours 7C and 7D - First utilization tour,

Tour 8F - Executive officer tour,

Tours 9C and 9D - Second utilization tour,

Tour 10E - Commander command tour.

Early department head path III is depicted in Figure 2.3 with the tours explained as follows:

Tours 1E, 2A and 3E as in path I.

Tour 4B - Postgraduate School,

Tours 5E and 5F - Second department head tour,

Tours 6C and 6D - First utilization tour,

Tours 7E and 7F - LCDR sea tour,

Tour 8E - Executive officer tour,

Tours 9C and 9D - Second utilization tour,

Tour 10E - Commander command tour.

2. Advantages and Disadvantages

There are several advantages to an early department head career path with respect to the career path as it presently exists. The primary advantage is that they all offer the young junior officer a challenge early in his career. With this career path the opportunity exists for a more junior officer to take on

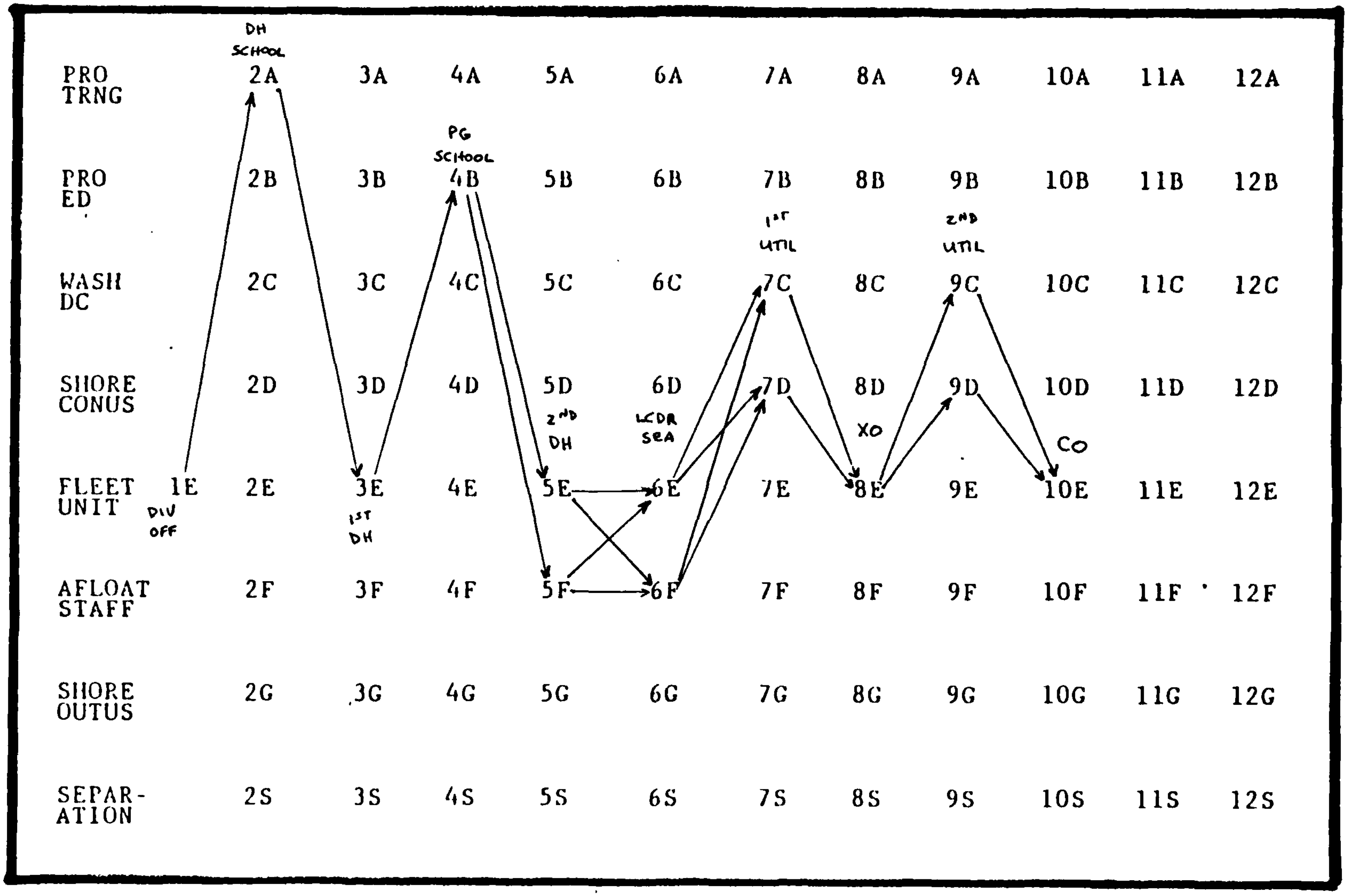

Figure 2.2 Network Representation of an Early Department Head Path II

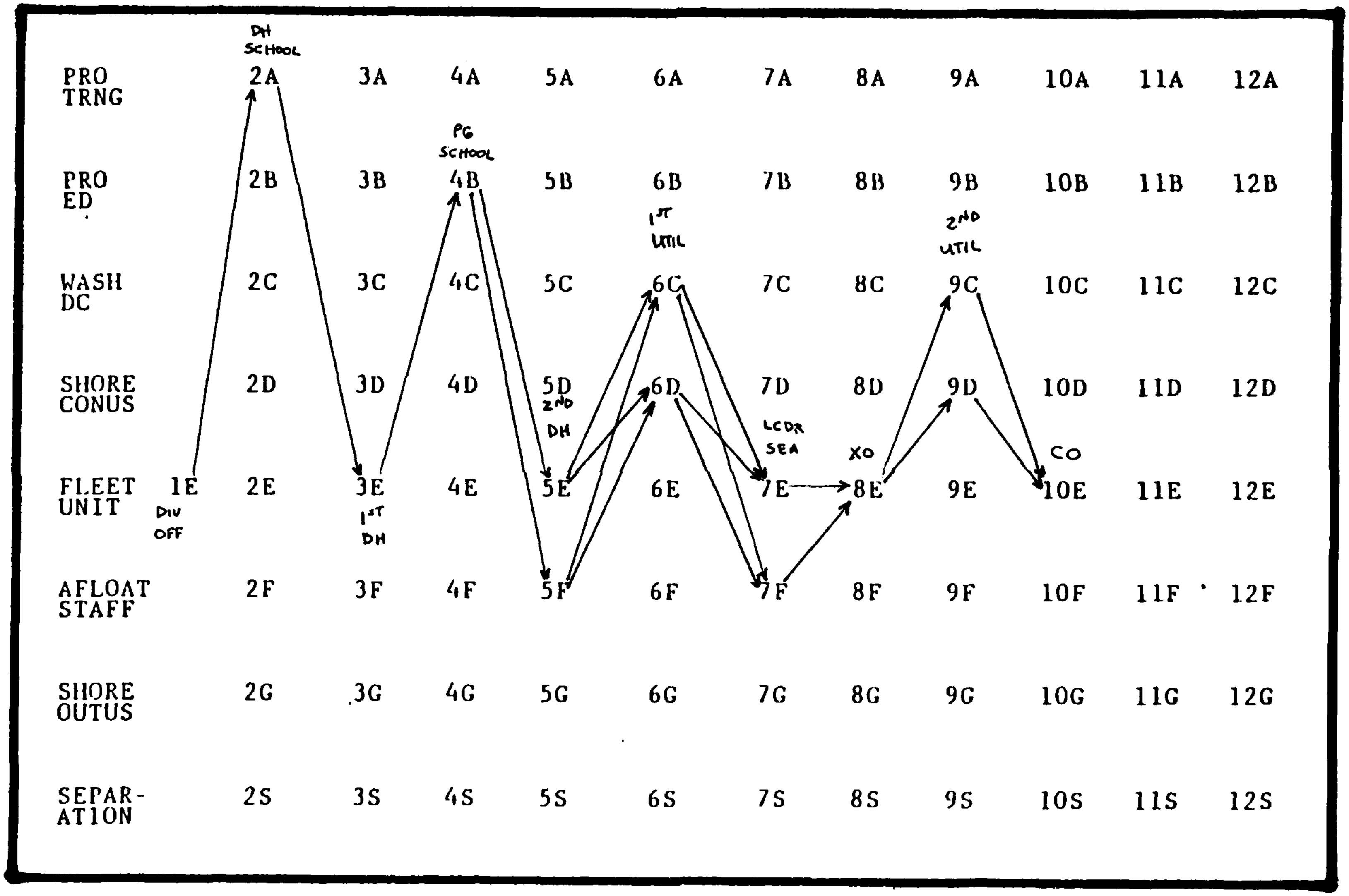

Figure 2.3 Network Representation of an Early Department Head Path III

greater responsibility and gain valuable experience earlier in his career. A second advantage is that this career path could reduce some of the LCDR 'down detailing' (i.e., LCDR's filling Lieutenant billets) that currently exists. One of the causes of this problem is that officers are beginning their department head tours when they are senior lieutenants or junior lieutenant commanders. The early department head path would alleviate this problem by having more officers start their tour as mid grade lieutenants. This would in effect increase the number of LCDR's available for LCDR billets the entire time that they are of that rank [Ref. 3: p. 99]. Yet another advantage is that the early department head path could be used if retention dropped or if a year group were smaller than needed to fill department head billets. Finally, in each of these alternative paths there is ample opportunity for homesteading in the same port or shore station primarily through the linking of sea duty tours. This policy will be explained in Chapter III.

The primary disadvantage of these paths is the effect they might have on more senior year groups who are in competition for department head school. By selecting more junior officers the selection ratio for the more senior officers will go down. Furthermore, the morale of the senior officers might suffer. Another potential problem that could develop would be that junior officers might not be available to fill shore requirements at, say, the Postgraduate School in sufficient numbers. A disadvantage of these paths that could be turned into an

advantage is that they all involve two PCS moves within one year. This occurs when the officer moves from his initial sea tour (1E) to department head school (2A) and then to his first department head tour (3E). This disadvantage exists with the current career paths, except that it occurs later in the officer's career. This problem could be reduced or eliminated if those in the early department head path were guaranteed their next duty station. This policy would encourage homesteading or if a change of homeport is involved it would enable the officer to settle his family in the new homeport and thereby eliminate the cost of moving his household goods twice instead of once.

The principle advantage that specifically applies to path I is that the first utilization tour follows right after postgraduate school. Having a utilization tour following graduate school should enable the officer to apply his new knowledge much more efficiently resulting in a higher degree of effectiveness than if he had followed current policy. Current policy has surface warfare officers returning to sea duty after their postgraduate school education prior to a utilization tour. This sea tour can result in a two to four year delay in having the officer serve his first utilization tour. While this sea tour is vital and necessary from a professional development stand point, it nevertheless reduces the officer's effectiveness when he finally serves his utilization tour due to the usual atrophy of skills or knowledge when unused over a long period of time.

The major drawback to path I is that the officer spends about eighty five percent of his first six and a half years in the Navy at sea. Presently that percentage is about fifty four percent. However, the difference in sea duty time between an officer on path I and an officer on the present career path eventually evens out around the eleven year point. At eleven years the percentage of sea duty for each is about fifty percent. A potential drawback of these career paths is the lower retention rate possible with increased sea duty in the early career years. A final drawback is that by sending the officer from graduate school directly to a utilization tour the officer is not available for sea duty for four to five years. The selection of the more qualified/experienced officers for this program will reduce the amount of effectiveness initially lost upon the officer's return to sea duty.

The advantages inherent in paths II and III are that they provide a break for the officer after four and a half years of sea duty and that the officer's obligation is extended to eight years [Ref. 3: p. 101]. This should result in higher retention and make this career path more attractive to the individual officer. An additional benefit of these paths is that the department head tours are split up by attendance at postgraduate school. This is advantageous in that these officers are eligible for any homeport. This in turn allows greater flexibility in the homesteading of those department heads who serve consecutive department head tours. Having a pool of officers who can go

anywhere enables the detailer to PCS fewer officers by moving only those who have to move, for example those leaving graduate school, to fill a billet. The potential problem that exists with splitting up the department head tours with graduate school is that there might not be enough officers available to fill all second tour department head billets. Presently the majority of officers go directly from their first to their second department head tour. By sending some of these officers to postgraduate school they are taken out of this flow which could result in an insufficient number of officers being available to fill the second tour department head billets.

An advantage of path II is that having the executive officer tour preceded by and then succeeded by utilization tours should allow the officer to be more proficient during his second utilization tour as he shouldn't lose his expertise all that much while back at sea. The drawback to this is that the initial utilization tour is the third tour following graduate school. Not only will the officer's knowledge and skills in his subspecialty have become rusty by then, but current policy specifically requires that an officer serve his first payback or utilization tour within two tours of completing his postgraduate school education. This situation is much like the officer under present policy who goes from graduate school to department head school and then to his two department head tours. In each case he serves three and a half to four years prior to a utilization tour. From that view point this disadvantage is acceptable.

Path III meets this two tour requirement having the officer serve his utilization tour one and half to two years after graduate school.

3. Model Implementation

For the purpose of demonstrating an early department head alternative career path on the model version I will be utilized. To do this, some assumptions must be made prior to implementing any changes on the model. The assumptions are that:

a. any time there are two alternative tours in the path to go to the distribution percentages will be;

   1) for sea duty/afloat staff, 80/20;
   2) for Washington, DC/shore CONUS, 50/50.

b. twenty percent of all officers will follow this path. This assumption is made because it is a big enough change to allow us to see if it has any effect on the SWO community yet small enough so as to not entirely alter the current SWO career path.

c. the officers who follow the early department head path will forego their first shore duty opportunity in order to pursue this alternative career path.

Two methods of implementing this change will be presented: a short and a long method. The short method allows a quick snapshot look at implementing the change while the long method allows the analyst to more fully integrate the change in the model. With the long method the officers following the early department head path are more easily tracked or followed as they progress from tour to tour. The changes to the model using the short method are as follows:

1. Change the transfer path percentages from tour 1E as follows;

a. increase the percentage going to 2A from four to twenty,

b. decrease the percentage going to 2D from twenty four to twenty,

c. decrease the percentage going to 2E from fifty three to forty one,

2. all transfers from 2A will be to 3E;

3. change the length of tour 2A from zero to two quarters;

4. change the length of tour 4F from six to eight quarters (this evens the length of tours 4E and 4F);

5. set the low limits for tours 7E, 8E and 10E at 195, 110 and 180. For steady state case use 660, 486 and 680 as the respective low limits.

6. save the transfer path, tour length and low limit data using the save feature of the model;

7. using the new data, reinitialize the data and run the model starting from time zero.

Running the model for as many as 15 years does not violate any of the low limits meaning that this alternative is feasible. To conduct an analysis of this change for the steady state case simply make the changes in the model as listed above using the steady state low limit values as applicable. Running the model for the steady state case, the limits are violated for a three year period before the limits are met again. The violations are minor in that the number of officers is within five of the limit. A full interpretation of the results will follow the long method of implementing this change.

To use the long method of implementing this alternative career path some formulas and definitions must be utilized. Those formulas and definitions are:

t = the number of the current tour,

$ED(t)$ = the number of early department heads in their last quarter of tour t,

$ED(t-1)$ = the number of early department heads in their last quarter of tour $t-1$,

$EDTP(t)$ = the transfer percentage for early department heads from tour t to tour $t+1$,

$EDTP(t-1)$ = the transfer percentage for early department heads from tour $t-1$ to tour t,

$N(t)$ = the total number of officers in their last quarter of tour t,

$BN(t)$ = the number of non early department head officers in their last quarter of tour t, (Base Number).

Then,

$$ED(t) = ED(t-1) \times EDTP(t-1),$$

and

$$BN(t) = N(t) - ED(t).$$

Also, $OTP(t)$ = the numbers of the original transfer paths from tour t, and $NTP(t)$ = the numbers of the new transfer paths from tour t, then,

$$NTP(t) = \{OTP(t) \times BN(t) + EDTP(t) \times ED(t)\}/N(t) \qquad \text{(Eqn 2.1)}$$

The changes to the model using the long method are as follows:

1. complete changes 1, 3, 4, and 5 as in the short method;

2. run the model for the length of tour 2A, two quarters;

3. compute new transfer path percentages from equation 2.1;

4. repeat steps 3 and 4, running the model separately for the lengths of tours 3E, 4E/4F, 5B, 6C/6D, 7E/7F, 8E, 9C/9D and 10E and then computing the new transfer paths from equation 2.1;

5. save the new transfer paths, tour length and low limit data using the save feature of the model;

6. using the new data, reinitialize the nodes data and the years and quarters counter prior to running the model from time zero. For the steady state case use STEADY30 Nodes data.

The low limits for these examples were set based on the number of billets in the fleet. Tour 7E represents the LCDR complex at sea tour, tour 8E represents the LCDR executive officer tour and tour 10E represents the commander command tour.

Once the changes to the model have been made the model can be run for any length of time desired. After running the model for 15 years the low limits have not been violated indicating that the change is feasible. That is to say that implementation of this career path change will not adversely impact the ability to man the three tours where the low limits were set. As in the short method of implementation a steady state case can be analyzed using the applicable steady state procedures noted previously. The model user can easily set other low or high limits for any tour in order to assess other effects of the proposed changes in policy.

B. EXTENDED OR SECOND COMMANDER COMMAND TOUR

The length of the commander command tour is currently twenty seven months. Present policy allows for up to ten percent of a year group to serve a second commander command tour if required. However, the number of officers who actually have two command tours as commanders is very small. A change in policy execution that would have ten percent of the officers serving in this tour either have their tour extended or allowed to serve a second

commander command tour would keep our best commanding officers at sea longer where they are needed most. By extending the command at sea time of the best commanding officers shipboard readiness should increase. This increase would be due to the continuity of command.

There are, however, some negative aspects to implementing a policy change such as this. Increased sea duty time would increase the stress factor on the commanding officers. This might be detrimental to readiness. Longer tours would mean that the selection ratio for command would be reduced which could affect morale and retention. This is due to the interrelationship between selection ratio and tour length. That is, given a set number of billets and a set number of officers, (year group size is averaged over five years), increasing the tour length will decrease the selection ratio. For example, if current tour length is two years, the number of commands is 200 and the number of officers eligible for command is also 200 then the selection ratio is 50 percent. If ten percent of the officers are extended for a year the number of commands a year drops to 97 which drops the selection ratio to 48 percent. This steady state computation is as follows:

Before extension:

Billets/Tour Length = 200/2 = 100 Billets available each year.

Billets Available/Officers Eligible = 100/200 = 50% Selection Ratio.

After extension:

Billets/Tour Length = 180/2 + 20/3 = 90 + 6.67 = 96.67 Billets available each year.

Billets Available/Officers Eligible = 96.67/200 = 48.33% Selection Ratio.

Another drawback to this policy is that the number of officers available to fill post commander command at sea billets would decrease. The decrease would result from two factors. The first is that fewer commanding officers would be rolling on an annual basis and secondly the officers serving an extended or second command tour would have to be sent ashore.

Extending the length of the commander command tour could be implemented two ways. The first is to have the officer's tour extended onboard at his current command for six months to a year. The second is to have the officer attend short school for six months to a year between his first and second commands. The length of the second tour in this case could be 18 months. This path is depicted in Figure 2.4. (Tours 1 through 11 are not shown in Figure 2.4 as they follow the standard tour progression depicted in Chapter I.) A variation of this would be to allow the officer one to three months leave between the two commands.

1. Model Implementation

To demonstrate this change to the career path with the computer model the path illustrated in Figure 2.4 will be used. For this example ten percent of those who serve a commander command tour will be given a second command. Tour 11A represents

PRO TRNG		2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	SECOND CDR CMD 12A
PRO ED		2B	3B	4B	5B	6B	7B	8B	9B	10B	11B	12B
WASH DC		2C	3C	4C	5C	6C	7C	8C	9C	10C	11C	12C
SHORE CONUS		2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12D
FLEET UNIT	1E	2E	3E	4E	5E	6E	7E	8E	9E	CDR CMD 10E	11E	12E
AFLOAT STAFF		2F	3F	4F	5F	6F	7F	8F	9F	10F	11F	12F
SHORE OUTUS		2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G
SEPAR-ATION		2S	3S	4S	5S	6S	7S	8S	9S	10S	11S	12S

Figure 2.4 Network Representation of an Second Commander Command Tour

six months of school and/or leave for the officer between commands. Tour 12A represents the second commander tour. Tours 11A and 12A were chosen here simply because these nodes are presently vacant in the model. This alteration allows us to keep tour 10E at its current length and still simulate the "normal" career path of having officers serving two commander command tours. In order to analyze the above change the following changes must be made in the model:

a. Change the transfer path from tour 10E:

   1. increase the percentage going to 11A from 0 to 10 percent;

   2. decrease the percentage going to 11C from 23 to 18 percent;

   3. decrease the percentage going to 11D from 27 to 22 percent;

b. all transfers from 11A will be to 12A;

c. the length of tour 11A will be two vice zero quarter before;

d. the length of tour 12A will be six vice zero quarter before;

e. set the low limits for tours 11E and 11F at 30 and 36; for steady state use 120 and 138.

The low limits for this example are the number of fleet billets for those tours. Running the model for up to 5 years does not violate any limits indicating that there will be sufficient post command commander to man the sea and staff billets requiring those officers. As with the other examples the steady state case can be simulated using the low limits indicated and by initializing the nodes data with the STEADY30 file.

The impact of reduced retention due to this alteration in the career path can be simulated in the model by increasing the separation rates. To demonstrate this on the model a one percent increase in the separation rates from tour 1E, from tours two through six and activities C through G was made. To compensate for the increased separation rates the largest transfer path percentage was decreased by one percent. For example if the transfer path percentage from tour 1E to tour 2D was 34 percent it would now be 33 percent. Likewise if the 2C to 3A transfer path percentage was 80 percent it would now be 79 percent. The other paths would be similarly altered.

The above separation rates were selected to be changed because the officers in these tours are the most likely to be influenced by a change such as this. Tours at activities A (professional training) and B (professional education) were unchanged because officers at these billets incur an additional obligation and therefore they do not leave the Navy from these tours. After the sixth tour there should be no affect as the officers in these tour will probably stay in until the twenty year mark.

With the reduced retention rates and low limits indicated above the model was run for the same number of years with the result that the billets could be filled.

C. A LONGER INITIAL SEA TOUR

For the last few years the length of an officer's initial sea tour has been two and a half years. The length of this tour in the past had been at least three years. The change to shorten the tour length was necessitated by a fleet growing toward 600 ships and a limited number of berthing spaces aboard the ships presently in the fleet. Since changing the initial tour length is easier than adding bunks on a ship, the tour was shortened. By shortening the tour length more officers could serve their initial sea tours and would therefore be available around 1990 to serve as department heads. Once the 600 ship fleet is a reality the number of division officer billets should be sufficient to support the department head requirements without shortening the original three year initial sea tour. Additionally, there should no longer be a need to "prepare" a large number of division officers since the number of future department head billets will no longer be growing.

Once the fleet has been built up to its intended size some benefit could be gained through lengthening the initial sea duty tour. The increased sea duty should enable officers to become more proficient shiphandlers and more experienced in general thereby becoming higher quality surface warfare officers. An added benefit of lengthening the initial sea tour would be a reduced need for accessions. For example, if there were 3400 division officer billets to be filled with accessions and the tour length was 10 quarters long the requirement would be for 340

officers to be brought in each quarter. However, if the tour length were changed to 14 quarters the requirement would be only 243 officers each quarter. Bringing in less accessions could save funds that could then be put to use elsewhere. The potential drawback to this policy change is that increased sea duty might lower retention. The retention issue would have to be analyzed prior to changing the policy.

1. Model Implementation

In order to evaluate the lengthening of the initial sea tour the following changes in the model must be made:

a. change the number of accessions from 340 to 243;

b. change the length of tour 1E from ten to fourteen quarters;

c. set the low limits on tours 4E, 5E, 7E, and 8E at 375, 394, 195, and 110.

The low limits for this example are based on the number of billets in the fleet for the first and second department head tours, LCDR complex at sea tour and LCDR executive officer tour. Running the model for 5, 7, 9, 11, and 13 years reveals that none of the low limits have been reached. The change to the career path is therefore feasible. As in the extended commander command tour the retention issue can be addressed with the model by increasing the percentages of officers who are separated. To accomplish this we will assume that the separation rates in tours 1E and 2C through 2G will be affected. Additionally we assume that the separation rate will increase by four percent from each of these tours. To compensate for the increased separation rates

the other transfer path percentages from each of these tours will be decreased proportionately. The new transfer path percentages from node i to node j, P_{ij}' can be computed from the formula:

$$P_{ij}' = P_{ij} \left[\frac{1 - (W_i + D)}{1 - W_i} \right] \qquad \text{(Eqn 2.2)}$$

where P_{ij} is the old transfer path percentage from node i to node j, W_i is the old separation rate from node i and D is the increase in that separation rate.

For example, if the original transfer percentage from node 2C to 3A, $P_{2C,3A}$, was 80 percent and the separation rate from node 2D, W_{ZC}, was increased from 1 to 5 percent then the new 2C to 3A percentage, $P_{ZC,3A}'$, would be 77 percent from the formula above.

These changes to the separation rates in the first and second tours were made because the lengthening of the initial sea tour would probably affect retention from the first two tours of the career path. This is so because the officers in these tours would have just completed the lengthened initial sea tour. Once past the first two tours there should be no affect.

With these changes the model was run as before. Again the low limits were not violated. Similarly, another analysis could be run by the user with different rates.

D. SINGLE SHIP XO/CO SWO CAREER PATH

The combination of a growing fleet, limited end strength requirements, and the need to conserve funds where possible has made the search for new methods of increasing efficiency, fully manning sea billets and improving readiness a Navy-wide concern. A major revision to the SWO career path that might accomplish these goals would be to:

1. lengthen sea duty tours;
2. lengthen shore duty tours;
3. sequence the executive officer and commander command tours so that they are served on the same ship.

This new career path is illustrated in Figure 2.5. The following is a description of this "single ship" career path:

1. tour 1E, initial sea tour-- (4 years) SWO, EOOW qualifications attained, selected for department head school;
2. tour 2, shore duty-- (3 years);
3. tour 3A, department head school-- (6 months);
4. tour 4E, first department head tour-- (2 years);
5. tour 5E/5F, second department head tour-- (2 years) complete command qualifications;
6. tour 6, shore duty-- (3 years) selected for command;
7. tour 7E/F, LCDR/CDR sea tour-- (2 years);
8. tour 8A, PCO pipeline training -- (1 year);
9. tour 9E, executive officer tour-- (2 years);
10. tour 10E, commander command tour-- (2 years) same ship as XO tour;
11. tour 11, post command tour-- (2 or 3 years);
12. tour 12E/F, major command tour-- (2 years).

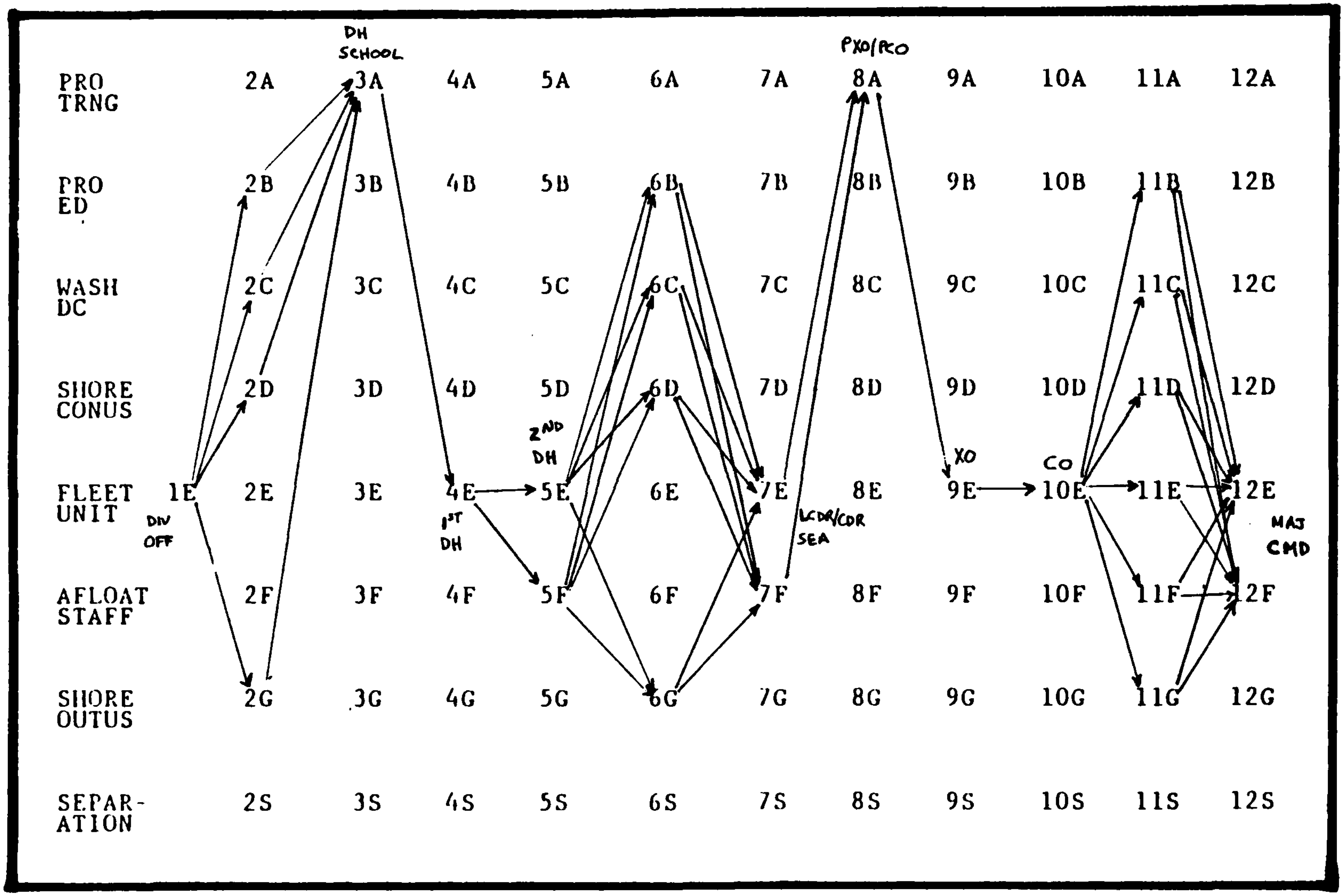

Figure 2.5 Network Representation of a Single Ship XO/CO Career Path

Note that the LCDR/CDR sea tour could be served during the sixth tour and then followed by a shore tour as tour seven.

1. Advantages and Disadvantages

The first advantage to this career path is that having the executive officer and commander command tours on the same ship will enable the commanding officer to know his ship, his personnel and his equipment better than if his total time on the ship were only two years. The four year blocks of sea duty and the three year blocks of shore duty will allow an officer the time to become more proficient in the billets in which he serves. As a result the fleetwide level of shiphandling, war fighting capability and overall readiness would improve. In addition, the number of PCS moves in a career will decrease which would not only save funds but it would also improve morale through greater family stability. Longer tours will enable the Navy to man the 600 ship fleet using fewer officers. It would also mean that fewer officer accessions would be required producing a savings in recruitment, training and other costs. A single ship career of this type would drop the number of screens from three to two to reach command. This would place greater emphasis on department head selection as it is the first of the two screens. Having one less screen means that the "brass ring" is not as distant a goal and might help retention and morale.

The percentage of time on sea duty in this career path would be about sixty four percent. This is only six percent more than the fifty eight percent now spent on sea duty. The new path

has an officer serving the same or slightly less time at sea than the sixty percent figure spent at sea by an officer who serves a second division officer tour under the present career path.

There are some potential drawbacks to this career path. One is that it is a departure from the traditional manner of the path leading to command. This poses potential problems during the transitional phase from the traditional method to the single ship method. Another drawback is that the longer periods of sea duty may negatively impact on retention. Still another is that some tours such as those covering eighteen months at the Postgraduate School don't easily fit into the three year shore duty slots. The LCDR/CDR sea tour adds two years to the middle of the career path and causes the executive officer/command tour to run to the 22 year mark. This in conjunction with the longer sea and shore tours would mean that an officer would spend most of his time in his commander command tour with the rank of captain. This could be remedied to an extent by having a three or three and a half year initial sea tour and by making the LCDR/CDR sea tour eighteen months long.

TABLE III

NUMBER OF OFFICERS IN SEA DUTY BILLET STEADY STATE CASE FOR SINGLE SHIP XO/CO CAREER PATH

Tour	Officers	Tour	Officers	Tour	Officers
1E	2560	5E	608	9E	530
2E	205	6E	203	10E	640
3E	124	7E	468	11E	72
4E	676	8E	0	12E	76

2. Model Implementation

To explore this on the model, the model will have to be modified as follows:

a. all sea (E) and afloat staff (F) tours will be eight quarters except tour 1E which will be sixteen quarters;

b. all Washington, D.C. (C), shore CONUS (D) and shore OUTUS (G) tours will be twelve quarters;

c. professional education (B) tours 2 through 8 will be eight quarters and 9 through 12 will be 4 quarters;

d. all professional training tours (A) will be two quarters except tours 8A and 9A which will be four quarters;

e. the transfer percentages from tours 3A, 8A and 9E will be 100 percent to tours 4E, 9E and 10E respectively;

f. the transfer path percentages from tour 1E will be:

   a. to tour 2A 14 percent,

   b. to tour 2B 19 percent,

   c. to tour 2C 14 percent,

   d. to tour 2D 24 percent,

   e. to tour 2E 16 percent,

   f. to tour 2F 8 percent,

   g. to tour 2G 10 percent,

   h. to tour 2H 5 percent,

g. the transfer percentages from tour 4E will be:

   a. to tour 5C 5 percent,

   b. to tour 5D 10 percent,

   c. to tour 5E 65 percent,

   d. to tour 5F 13 percent,

e. to tour 5G 5 percent,

f. to tour 5H 2 percent,

h. the transfer path percentages from tours 7B, 7C, 7D, 7E, 7F, and 7G to tours 8E and 8F will all be zero, the officers who would have been transferred to those tours instead are transferred to tour 8A, therefore:

a. the 7B to 8A transfer path percentage is 83,

b. the 7C to 8A transfer path percentage is 60,

c. the 7D to 8A transfer path percentage is 73,

d. the 7E to 8A transfer path percentage is 43,

e. the 7F to 8A transfer path percentage is 73,

f. the 7G to 8A transfer path percentage is 56,

g. all other transfer paths from these nodes remain unchanged,

i. set the number of accessions at 160.

The above changes to the model represent what the single ship career path would be like after the policy has been implemented and the system has reached equilibrium. Running the model for 30 years reaches a steady state with the number of officers in the sea and afloat staff billets depicted in Tables III and IV.

TABLE IV

NUMBER OF OFFICERS IN AFLOAT STAFF BILLETS STEADY STATE CASE FOR SINGLE SHIP XO/CO CAREER PATH

Tour	Officers	Tour	Officers	Tour	Officers
1F	0	5F	91	9F	20
2F	102	6F	81	10F	7
3F	8	7F	65	11F	129
4F	9	8F	0	12F	54

III. PERMANENT CHANGE OF STATION

Reducing the number of PCS moves through altering the Surface Warfare Officer career path can be accomplished through one of the following four methods:

1. retouring officers in the same homeport;
2. retouring officers in the same shore location;
3. extending tour lengths (primarily sea billets);
4. reduce the amount of pipeline training given officers.

A. RETOURING IN THE SAME HOMEPORT

The retouring of officers within the same homeport is something that the Navy is already doing. At present, approximately 60 to 65 percent of the officers transferring from one department head billet to another are being kept in the same homeport. This concept could be expanded upon to include retours of the split tour division officers (tour 1E to 2E), and at the lieutenant commander level by having a LCDR serve his at sea complex tour (tour 7E) and his executive officers tour (tour 8E) out of the same port. Present policy dictates that up to one third of the SWO officers will serve a second division officer tour to either gain more experience or to accomplish qualifications not attained while on their first tour. By increasing the number of these officers homesteading in the same homeport the quantity of PCS moves will be reduced and funds saved.

The strategic homeporting policy of dispersing the fleet to more homeports such as Everett, Washington, Staten Island, the gulf coast and others could either hinder or aid homesteading. The dispersal would be detrimental to the concept of homesteading if only limited classes of ships are moved to new homeports, i.e., if only frigates or destroyers are sent to New Orleans. Homesteading would be helped if whole battlegroups including the amphibious and support classes of ships were move to the new ports. This policy would be beneficial in two ways. It would help the Navy in that the flexibility inherent in having a wide variety of ships in each port from which to form task forces. For example, an amphibious task force could be formed in either San Diego or Everett, Washington. It would aid homesteading because the wide variety of billets in each port would allow flexibility when detailing members of the SWO community.

Implementing a strategic homeport policy that has the fleet dispersed in the manner just presented would be difficult to achieve, because not every type of ship can be homeported anywhere. Two examples of this are amphibious and Mobile Logistic Support Forces (MLSF). The problem with stationing amphibious force ships is that they need to be relatively near the marines that they will embark. On the west coast that means stationing them in Southern California and on the east coast the mid-atlantic (Virginia and North Carolina in particular), area. Having amphibious ships in Everett, Washington would mean that greater amounts of resources would have to be utilized in order

to embark and debark marines than would be the case if the ships were homeported in Southern California. The additional fuel costs alone might preclude the stationing of amphibious ships any where except near the marines. There are also limitations to where the MLSF ships can be stationed. They must be near supply depots in order to obtain the fuel ammunition and stores that they will supply to the fleet. The supply capabilities of the various ports therefore dictate to a large extent where the MLSF ships will be stationed. The reality of the strategic homeporting concept seems to be that the fleet will be dispersed and that officers will have to be moved in order to man them. Homesteading in general will probably suffer as a result. In particular the department head tour sequencing from MLSF/amphibious to cruiser-destroyer and vice versa will mean that more department heads will be changing homeports.

1. Computing PCS Savings

Nevertheless, the idea of homesteading is still feasible and its benefits could be explored with the model. To demonstrate how the homesteading concept can be explored on the model an example using the transfers of Department Heads from their first to second tour (tour 4E to tour 5E) in both steady state and with present data will be used. This example illustrates the maintaining of split tour department heads within the same homeport at an increased rate. If under present policy sixty five percent of these officers are being kept in the

same port for their second tour and new policy is to increase the retour rate to seventy percent, the number of additional PCS moves saved is:

$$(Y \times .70) - (Y \times .65) = Y \times .05$$

where Y equals the number of transfers from tour 4E to tour 5E.

The number of eliminated PCS moves per quarter will always be five percent of 4E to 5E transfers. It follows that when using current data the number of PCS moves saved over a year equals .05 x (sum of quarterly transfers). For the steady state case the number of PCS moves saved in one year is equal to 4 x (.05 x quarterly transfers). For this example the yearly number of moves saved in steady state equals 16 which is calculated as 4 x (.05 x 76). Note that the steady state and current data values will be different. The current data values must be computed for each quarter and can be done by running the model one quarter at a time and using the number of personnel being transferred from 4E to 5E. The results of these calculations using current data can be found in Table V.

TABLE V

COMPUTING PCS MOVES SAVE

Quarter	Transfers		PCS Moves Saved
1	42	x .05 =	2
2	42	x .05 =	2
3	42	x .05 =	2
4	42	x .05 =	2
5	42	x .05 =	2
6	42	x .05 =	2
7	42	x .05 =	2
8	42	x .05 =	2

B. RETOURING AT THE SAME SHORE ESTABLISHMENT

The concept of allowing officer to remain in the same geographical area, homesteading, includes two types of transfers:

1. transferring of officers from sea duty to shore duty while keeping them in the same homeport, Norfolk for example; and

2. retouring officers from shore duty to shore duty within the same location such as Washington, DC.

As with the retouring of department heads some of this is already being done. The program could be expanded upon. Examples of how the program could be expanded:

3. allowing the post command commander, who has failed to screen for major command, to be kept where he is and assigned a new billet;

4. retouring in the same location the LCDR/CDR who has served in an executive officer's billet but has failed to select for command.

This LCDR/CDR who has served 14 or 15 years by the time he has completed his executive officer tour could effectively serve out his career in the same location, e.g., with back to back tours in Norfolk. The same could be said of the post command commander in that he would serve a 23 to 25 year career, the last four to six years of which would be in, say, Washington, DC. This policy change is not without its drawbacks. This type of policy change would reduce the number of commander and post command commanders to serve in sea billets. Any policy change would have to ensure that sea billet requirements are met first and then same station retours could be looked at. To ensure sea billet requirements are met the low limit feature of the model will be utilized. Another point of note here is that the officers who are not sent

back to sea have probably eliminated their chances of being promoted beyond the rank that they presently hold. Although no information is available on this subject it is felt that while most officers will probably want to remain competitive, there is also those for whom this change would hold appeal. Note also that officers in this category who are kept in fleet concentration areas such as Norfolk or San Diego could fill sea duty billets and still remain competitive. The average number of officers in year groups 62 to 67 who have served their executive officer tour but failed to select for command is 31 and of these about 32 percent (i.e. 10 officers) have had their last and present duty station in the same location. Perhaps up to fifty percent, (around 15 officers per year group), of those eligible for the program could be slotted for this path. Eligibility in this case refers to those officers who have failed to select for the next higher position. For example, the officer who has served his executive officer tour as a LCDR but has failed to be selected for commander command is "eligible" for the program. Additional drawbacks to this concept are the small number of officers affected and also the notion that officers in this category will be moved in order to fill the needs of the Navy more readily than will be the case for the post commander command officer who fails to select for major command.

This change in the SWO career path might also provide the Surface Line community with some greater expertise in some of the subspecialist areas. By being in Washington for six years

continuously an officer would probably acquire a greater degree of proficiency in his area of subspecialty.

1. Norfolk Forever

To demonstrate this policy change on the model we will show the post executive officer career path for those who fail to screen for command and remain in Norfolk for the remainder of their Navy career. In reality this officer will proceed along the following path of tours:

8E(XO)--9D(Shore)--10D(Shore)--11D(Shore)--12H(Home).

For purposes of the model he will proceed along this path:

8E--9A--10A--11A--12H.

This methodology was adopted for two reasons. The first is that it allows us to more easily track the individuals involved. The other reason is that tours 9A, 10A and 11A are currently not used in the model whereas tours 9D, 10D and 11D do have other officers being transferred to them.

a. Model Implementation

The changes to the model required to simulate the above policy are as follows:

1. change the transfer path percentages from tour 8E by:
    a. increasing the number of those going to 9A from 0 to 15 percent,
    b. reducing the number of those going to 9D from 31 to 16 percent;
2. all transfers from 9A will be to 10A;
3. all transfers from 10A will be to 11A;
4. all transfers from 11A will be to 12H (Separation);

5. the length of tours 9A, 10A and 11A will be changed from zero to ten quarters;

6. low limits will be set on the number officers in sea tours: 9E, 10E, 11E, 11F, and 12E at 89, 180, 30, 36, and 41.

Low limits for the steady state case were set at 312, 680, 120, 138, and 160 for tours 9E, 10E, 11E, and 12E which is the number of officers at each tour. The low limits for the steady state case are violated when running this example. When a new steady state is reached in approximately nine years the number of officers in each tour is lower than the original numbers meaning that if the limits were minimum manning levels then this change might not be feasibility.

TABLE VI

NORFOLK FOREVER PCS MOVES SAVED

Quarter	Current Data Tour 9A	Current Data Tour 10A	Total	Steady State Data Tour 9A	Steady State Data Tour 10A	Total
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	4	0	4	12	0	12
11	4	0	4	12	0	12
12	4	0	4	12	0	12
13	4	0	4	12	0	12
14	4	0	4	12	0	12
15	4	0	4	12	0	12
16	3	0	3	12	0	12
17	4	0	4	12	0	12
18	4	0	4	12	0	12
19	3	0	3	12	0	12
20	4	4	8	12	12	24

21	4	4	8	12	12	24
22	3	4	7	12	12	24
23	3	4	7	12	12	24
24	3	4	7	12	12	24
25	3	4	7	12	12	24
26	3	3	6	12	12	24
27	3	4	7	12	12	24
28	4	4	8	12	12	24
29	4	3	7	12	12	24
30	4	4	8	12	12	24

The figure of fifteen percent in the proportion of officers going from 8E to 9A was chosen based on the reasoning that follows. Assume that about 60% of a year group is selected for executive officers and that about 75% of the executive officers select for commanding officers. Then for 100 officers 60 serve as executive officers and 45 go on to serve as commanding officers. Therefore, 15 officers (15%) of a year group serve as XO but not CO.

Running the model quarter by quarter and adding up the number of officers to be transferred from tours 9A and 10A will be the number of PCS moves saved. The number of officers transferred from tour 11A are neither added in nor subtracted out of the number of PCS moves saved. This approach was adopted in view of PCS moves saved. This approach was adopted in view of the fact that an officer in this track will probably leave the service at or soon after his twentieth year of service. Since all officers eventually separate from the service those transfers should not be included in the calculations of PCS moves saved. The results of this analysis are in Table VI.

Note that no savings are realized for the first two and a half years. This is because PCS savings will not be realized until it is time for these officers to be transferred. The number of PCS moves eliminated for this example is eight in year 3, sixteen in year 4, fourteen in year 5, thirty in year 6, etc.

The low limits in this example were not violated when using current data which means that all of the sea duty billets would be filled and that the change did not cause a shortfall of officers for sea billets.

2. <u>Washington Forever</u>

Another example of how the model might be used to determine the number of PCS moves saved by retouring an officer in the same port, would be the case where a post command commander has failed to screen for major command. In this case the officer will be transferred from sea duty to shore duty and remain there for at least two tours. For our example we assume that this officer is transferred from sea duty to Washington, DC and that he will remain in Washington until he leaves the service. Data from calendar year 1984 indicates that 34% of the surface warfare officers in Washington had tours over three years long. The average tour length for this group was fifty months or just over four years. The data indicates that a number of officers do retour in Washington and that this concept is feasible. In terms of the model the path is:

10E (Cdr Cmd) - 11D (Wash,DC) - 12D (Wash,DC) - Separation

This path will be represented on the model by:

10E -- 11A -- 12A -- Separation

This example is much like the previous one except that it is a "shorter" version. It is shorter in that the officer isn't retoured as many times as he was in the previous case. The methodology and rationale of why the example is constructed as shown is basically unchanged from the previous example. The number of PCS moves saved each quarter is equal to the number of officers in their last quarter of tour 11A.

a. Model Implementation

To run the example on the model the following changes must be made:

1. change the transfer path from tour 10E by:

    a. increasing the number of officers going to tour 11A from 0 to 20, and

    b. decreasing the number of officers going to tour (11C from 23 to 3;

2. all officers transferred from 11A go to 12A;

3. the lengths of tour 11A and 12A are changed from zero to ten quarters;

4. the low limits on tours 11E and 12E are set at 30 and 41;

5. note that there are no transfer paths from the twelfth tours, these officers could be kept where they are or retire from the service.

For the current data we will simply make the changes as indicated and then run the model. For the steady state case we must assume a steady state, make the changes and then run the

model. For the steady state case the low limits are 120 for tour 11E and 160 for tour 12E.

The number of potential PCS moves saved can be found in Table VII.

TABLE VII

WASHINGTON FOREVER PCS MOVES SAVED

Quarter	Current Data			Steady State		
	Tour 11A	Tour 12A	Total	Tour 11A	Tour 12A	Total
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	6	0	6	17	0	17
11	6	0	6	17	0	17
12	6	0	6	17	0	17
13	6	0	6	17	0	17
14	6	0	6	17	0	17
15	6	0	6	17	0	17
16	6	0	6	17	0	17
17	6	0	6	17	0	17
18	5	0	5	17	0	17
19	5	0	5	17	0	17
20	5	6	(11)5	17	17	(34)17

Again as in our previous example no PCS savings are obtained until ten quarters after the change to the career path is made. This is because the officers on this track don't come up for transfer until they complete their initial tour at their "permanent" duty station. Permanent here means that the officer's next tours will be in that duty station. If the

officer does not leave the service after his twelfth tour and he can be kept in the same area of his twelfth duty station then further savings accrue in PCS moves. This is shown in the table as the number in parenthesis. In our example up to 11 moves could be saved if all the officers stayed in the Navy for another tour. It is noteworthy that the low limits were not violated when using current data. This means that all sea duty billets may be filled. As in previous examples the low limits were violated in the steady state case. Steady state is again obtained in approximately seven years.

C. EXTENDING TOUR LENGTHS

The lengthening of an officer's tour in and of itself will not result in any PCS savings except for the short time while the officer's tour is extended and he is therefore not transferred. The lengthening of one or two tours during a career, however, could result in one or two fewer moves in an officers career and thereby saving PCS funds. That is, extending an officer for an extra three months aboard a ship does not truely save any PCS moves it only delays the time when the officer moves. Only the extension of sea duty tours will be examined as they have the largest potential impact on SWO manning and career paths.

In a previous thesis an example was given of the extension of the initial sea, department head and the executive officer tours [Ref. 3: p. 110]. This example showed that in the same thirteen year period all sea billet requirements could be met and one PCS

move eliminated with an alternative career path. His example had one group of officers spending 54 percent of their time at sea while the others spent 69 percent of their time on sea duty. This second group would be on sea duty two years longer than their counterparts. This extension of two years equates to nearly a 28 percent increase in sea duty from what the first group serves. What is significant here is that extended tours can eliminate the number of moves in a career. A potential problem exists in that the size of the increase in sea duty time could reduce retention. Any plan of extension of tour or increased sea duty would have to bear this in mind.

1. Commander Command Extension

Examples of changes in the SWO career path that might save a PCS move during a career would be the lengthening of the initial sea tour (tour 1E) from two and a half to three or three and a half years. Another potential change would be to extend commander command tours (tour 10E). This second change might be accomplished by extending the tour length from two to three years or by allowing a second commander command tour in the same homeport right after the first command.

The benefits and drawbacks in changing the length of the commander command tour were enumerated in the previous chapter. As such the issues involved will not be discussed again. The example presented in Chapter II on this topic looked at the feasibility of such a change. This example will explore the potential savings in PCS moves.

To demonstrate a tour extension example on the model both a steady state and a current data example will be shown. The example will be the extension of tour 10E (normally the commander command tour), from two to three years. In this scenario 20 percent of those serving in tour 10E will be extended. The percentage of those extended in their command tours was chosen as 20 percent as any large percentage of extensions might adversely impact on command opportunity. As mentioned previously, the current maximum percentage of retours is ten.

a. Model Implementation

For simulating on the model the extended command tour the basic model must be altered. Tour 11A will be utilized as the node representing where all tour 10E extensions are transferred. As before tour 11A was chosen because it is presently vacant in the model. This alteration allows us to keep tour 10E at its current length and still simulate extending some of the officers in that billet by one year. The changes to be made to simulate this example are:

1. change the transfer path from tour 10E:
    a. increase the percentage going to 11 from 0 to 20,
    b. decrease the percentage going to 11C from 23 to 13,
    c. decrease the percentage going to 11D from 27 to 17,
2. the transfer paths from tour 11A are:
    a. to 12A 0 percent,
    b. to 12B 5 percent,
    c. to 12C 40 percent,

d. to 12D 50 percent,

e. to 12E 0 percent,

f. to 12F 0 percent,

g. to 12G 5 percent,

h. to 12H 0 percent,

3. the length of tour 11A will be changed to four vice zero quarters.

For steady state (using STEADY30 data currently in the model) the number of PCS moves saved in one year is 68 which is derived as 4 x (.20) x Y = (.8) Y where Y equals the number of officers transferred from tour 10E each quarter. These savings are only short term in that we have only delayed their transfer by one year. After one year these officers will be transferred and not more short term PCS moves have been eliminated. However, this tour extension may have reduced the total number of moves in the officers career, a point that was addressed in Chapter II.

For the example with current data we must run the model quarter by quarter in order to compute the number of PCS moves saved. The results of these computations are in the table below. For each quarter the number of moves saved is calculated by:

Number of PCS moves saved = (.20 x E) - A, where E equals the number of officer transfers from tour 10E and A equals the number of those officers transferred from tour 11A. The results can be found in Table VIII.

TABLE VIII

EXTENDED COMMANDER COMMAND TOUR PCS MOVES SAVED

QUARTER	COMPUTATIONS E A	NUMBER OF MOVES SAVED
0	(.2 X 31) - 0 =	6
1	(.2 X 30) - 0 =	6
2	(.2 X 31) - 0 =	6
3	(.2 X 30) - 0 =	6
4	(.2 X 31) - 5 =	0
5	(.2 X 30) - 5 =	0
6	(.2 X 23) - 5 =	0
7	(.2 X 23) - 5 =	0
8	(.2 X 23) - 5 =	0

2. Extended Initial Sea Tour Model Implementation

Another example of extending tours to save PCS funds would be the extension of the initial sea tour (tour 1E) by one year. The changes to the model are as follows:

a. The length of tour 1E will be changed from ten to fourteen quarters;

b. The low limits for tours 4E, 5E, 7E, and 8E will be set at 375, 394, 195, and 110.

The number of PCS moves saved in the first fiscal year for this example is 1360 which is equal to the total number of officers who would have been transferred during the first four quarters of this example. (1360 = 4 x 340) Note that PCS moves are only saved in the first year, after that these officers will be transferred and no further PCS savings can be garnered from this extension.

D. REDUCED PIPELINE TRAINING

The reduction of pipeline training in order to reduce the number of moves prior to arriving at an ultimate duty station is presently a policy being carried out in the surface line community. The demonstration of how this policy saves PCS funds is not possible on the model and will therefore not be addressed from that perspective. From the view point of attempting to reduce PCS moves during training there is a way in which money could be saved. When ordering an officer to a course such as department head school in Newport, Rhode Island a few PCS moves could be saved if the officer were notified of the ship to which he will eventually be assigned by indicating it on the orders to department head school. For example, if the officer was transferred from the Naval Postgraduate School in Monterey, California to Newport, Rhode Island and then to a ship in Norfolk, Virginia he will have made two PCS moves with his family. If the officer new he was going to Norfolk after Newport then he might move his family from Monterey directly to Norfolk and save the government the difference between moving the whole family twice and moving the family once and the individual officer twice. If the officer had been sent from San Diego, California to Newport and then back to San Diego he has again moved his family twice. If he could have left his family in place then the only funds expended would be those to get the officer to Newport and back. Although some officers might still choose to move their families to each duty station that they are

assigned to, still, if just one officer sends his family ahead to the ultimate duty station then a PCS move has been saved. The reason this policy is currently not being done is due to the uncertainty and somewhat unstable environment caused by the circumstance that not all department heads finish out their tours, not all department heads serve both of their tours and not all graduate on time from department head school. Due to these factors flexibility must be maintained in the form of sending the latest department head school graduates to where they're needed most. This translates to receiving orders to a ship while in school vice before getting to the school. It still might be worth experimenting with the program to see if PCS funds could be saved.

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This work has presented and analyzed several SWO career path alternatives in an attempt to reduce the number of PCS moves and thereby save PCS funds. The career path alternatives were presented with the goals of minimizing turbulence within the SWO community, meeting sea duty requirements and maintaining achievable career path goals. The primary methods of reducing PCS moves discussed were through extended tour lengths and greater use of homesteading.

A. SUMMARY AND CONCLUSIONS

The extension of tours is clearly a method of reducing the number of PCS moves, however the feasibility of that extension must also be explored. As shown in Chapter II section B either by extending the commander command tour or allowing a second commander command tour to occur in the same port, fewer officers will have to be moved without decreasing the command selection ratio significantly. Although having the better commanding officers stay at sea longer should benefit the fleet, it could also be harmful to the officers' career. Extending the initial sea duty tour once the 600 ship Navy is a reality would also save PCS funds by requiring fewer moves and would require fewer yearly accessions. The career path leading to a single ship executive officer and commanding officer tour discussed in Chapter II section D would also reduce the total number of PCS moves in an

officer's career through the use of longer sea and shore duty tours. This career path would also require fewer yearly accessions, but the increased sea duty time could result in lower retention. The transition to this career path from the present one would probably have to be phased in over several years and was not explored in this thesis.

Increasing geographic stability or homesteading could also reduce PCS expenditures. Anytime an officer changes tours without changing the geographic area in which he lives a PCS move is saved. The early department head path that sends an officer to graduate school between department head tours could aid homesteading, because these officers would have to be moved to a new location allowing others to remain where they are.

Through this work career path alternatives have been presented, discussed and analyzed with the intent of reducing PCS moves while still maintaining a viable SWO career path. With the SWOPATH model determining feasibility in terms of filling billet requirements and enumerating the number of PCS moves saved has been accomplished for each alternative career path. The policy maker's decisions can now be made more intelligently, since he has explored what might happen if various policy changes are made in the SWO career path through the use of the SWOPATH model.

B. RECOMMENDATIONS

Further work in this area could be done by examining the strategic homeport concept and the effect it will have on the

Navy's ability to maintain geographic stability. The SWOPATH model might be adapted for this purpose of using the rows (activities) of the network as fleet concentration areas. In this manner any transfer out of an "activity" would be a PCS move. The low limit feature of the model could be utilized by using billet data at each port or base as the low limits for a node. High limits could be the maximum number of sea or afloat staff billets and low limits would be the minimum number of shore billets that have to be filled.

Another area for further study would be to identify the best method for transitioning from the career path as it presently exits to the single ship CO/XO career path. The model could probably be used again in a step wise manner to define when and what tour lengths and transfer paths should be changed.

Maintaining a viable SWO career path, ensuring that sea duty billets are adequately filled and reducing PCS costs were the primary areas of focus of this thesis. Using the SWOPATH model this thesis has identified some methods with which to achieve those goals.

APPENDIX A

CURRENT INVENTORY DATA FILE SAMPLE

SURFACE COMMUNITY OFFICERS BY DUTY STATIONS AND SCHOOLS

DESIGN	ACBD	FROM	TO	LOS1A	LAST DUTY STATION	TD1	HMPRT1	FROM	WEEKS	SCHOOL
1110	6012	8406		035	S PG MONTEREY	S	MONTEY	6206	07	516
		6109	8406	035	CG 26 BELKNAP	C	NORVA	5107	19	450
				000				6102	02	804
1110	7604	6406		031	T-AFS 10 MILDEPT	C	NORVA	7610	16	450
		8109	8406	081	LANDFORTRACO PAC	S	CORNDO	7607	09	690
		7912	8109	054	LKA 116 S LOUIS	C	SASEBO			
1110	7205	8406		120	NPHIBS LC GST	S	L CRK	8011	21	380
		6211	8406	120	LST1181 SUMTER	C	L CRK	7707	08	516
		6103	6210	104	FF1043 MCDONNELL	C	MAYPRT	7408	09	655
1110	8205	8406		020	S PG MONTEREY	S	MONTEY	8301	06	516
		8302	8406	020	FF1067 F HAMMOND	D	YOKSKA	8211	17	450
				000						
1110	6609	8406		157	FFG 46 RENTZ	C	SDGO	8311	02	162
		8103	8306	147	PHRSH COR GSKLTG	S	CORNDO	8307	04	362
		7906	8011	121	FF1083 COOK	C	SDGO	8306	17	513
1110	6009	8406		237	COMPHIBRON 5	C	SDGO	8403	04	233
		8112	8403	235	LPD 6 DULUTH	C	SDGO	8106	02	802
		7810	8102	204	COMCRUDESGRU 5	C	SDGO	8107	17	513
1110	6406	8406		200	FLCBTRC PAC GST	S	SDGO	7709	06	323
		8207	8406	200	DNA FD/CMD ALBUQ	S	ALBUQ	7310	09	655
		7907	8203	181	NSURFWPCDAHLGRE	S	DAHGRN	6811	26	380
1110	6009	6406		037	CV 60 SARATOGA	C	MAYPRT	8504	06	381
		8112	8406	037	FF1062 WHIPPLE	C	PEARL	3107	19	450
				000						
1110	7905	8406		050	S PG MONTEREY	S	MONTEY	8007	06	516
		6207	8406	050	DD 989 DEYO	C	CHARLE	8005	16	450
		8008	8206	030	DDG 18 SEMMES	C	PHILA			
1110	8011	8406		035	CG 34 BIDDLE	C	NORVA	8107	19	450
		8109	8403	033	FF1095 TRUETT	C	NORVA			
				000						
1110	7706	8406		070	FFG 46 RENTZ	C	SDGO	8308	24	380
		6101	8304	058	OPNAV	S	ARLING	7806	07	514
		7712	8101	035	DDG 22 STODDERT	C	PEARL	7710	17	450
1110	8005	6406		040	CG 48 YORKTOWN	C	NORVA	8312	06	381
		6303	9401	036	MTL	S	NORVA	8101	03	216
		8131	6302	027	FF1096 VALDEZ	C	NEWPRT	8012	19	450
1110	7612	6406		055	NETC NPTGENSKITR	S	NEWPRT	7906	16	450
		8301	8406	055	DDG 22 STODDERT	C	PEARL			
		7906	6211	039	DDG 34 SOMERS	C	PEARL			
1110	6306	8406		210	NPRTCUUSDSDSUSDC	S	SDGO	7601	01	595
		8107	8406	210	NPHIBS COR GST	S	CORNDO	7612	06	333
		7512	8102	176	LST1191 RACINE	C	SDGO	7211	07	575

APPENDIX B

SEPARATION DATA FILE SAMPLE

SURFACE COMMUNITY WHO HAVE SEPARATED FOR ANY REASON

DESIGN	GRADE	SERVICE	LOS	FROM1	TO1	LAST DUTY STATION	SCHOOL	FROM	WKS
1115	J	5 TO 10	99	8406	8406	NS PHILA PA OTH	594	7802	03
1115	J	5 TO 10	62	8109	8409	DD 966 HEWITT	662	8108	03
1115	J	5 TO 10	62	8407	8409	TPU SD TRANS OTH	514	8106	06
1115	J	5 TO 10	110	8203	8309	WASH HDQTRSSERDC	450	7612	16
1115	J	5 TO 10	66	8301	8503	NPTUIDAHO FL GST	450	8007	16
1115	K	5 TO 10	62	8112	8409	FFG 3 SCHOFIEL	160	8112	12
1115	J	5 TO 10	98	8108	8308	HRMC ALAMEDA CA	808	8205	02
1115	J	5 TO 10	98	8201	8408	FLCSTRC LNT GST	514	7712	07
1115	J	5 TO 10	99	8109	8408	CRUDIST MICHIGAN	450	7803	16
1115	J	5 TO 10	113	8204	8409	NROTC OREG ST U	450	7709	16
1115	J	5 TO 10	86	8304	8403	OPNAV	548	8002	05
1115	J	5 TO 10	64	8405	8406	TPU SD TRANS OTH	450	8110	19
1115	J	5 TO 10	83	8305	8410	LPH 7 GUADALCA	381	8403	06
1115	J	5 TO 10	103	8004	8303	FLTRGE SDGO	216	7807	03
1115	J	5 TO 10	75	8402	8505	FF1072 BLAKELY	548	8112	05
1115	J	5 TO 10	62	8209	8505	DD 987 OBANNON	450	8207	19
1115	J	5 TO 10	97	8301	8405	MSCO SAN DIEGO	514	8003	07
1115	J	5 TO 10	107	8210	8412	SWOSCOLC DT CORO	540	8209	04
1115	J	5 TO 10	107	8308	8409	COMPHIBRON 10	514	8605	07
1115	J	5 TO 10	95	8109	8309	NAVAL ACAD	596	7809	03
1115	J	5 TO 10	63	8209	8406	MSO 511 AFFRAY	516	8210	07
1115	J	5 TO 10	66	8403	8404	TPU SD TRANS OTH	450	8107	19
1115	J	5 TO 10	98	8208	8504	COMSCEUR LONDON	384	7803	13
1115	J	5 TO 10	67	8211	8405	FFG 10 DUNCAN	386	8305	04
1115	J	5 TO 10	66	8008	8403	CGN 36 CALIFORN	450	8007	16
1115	J	5 TO 10	89	8201	8502	SWOSCOLC DT CORO	351	8204	06
1115	J	5 TO 10	98	8007	8310	CGN 25 BAINBRI	162	8102	02
1115	J	5 TO 10	110	8208	8504	NAVAL ACAD	574	7706	52
1115	J	5 TO 10	75	8303	8406	AOR 7 ROANOKE	160	8112	12
1115	J	5 TO 10	86	8111	8308	CRUDIST SAN FRAN	160	8001	12
1115	J	5 TO 10	98	8210	8409	SWOSCOLC DT CORO	808	8103	02
1115	J	5 TO 10	75	8105	8409	AOR 1 WICHITA	450	8105	19
1115	J	5 TO 10	96	8203	8307	COMDESRON 6	548	8010	05
1115	J	5 TO 10	110	8207	8309	SURFLSSUPPG NOR	514	8107	07
1115	J	5 TO 10	86	8310	8410	NS LONG BEACH CA	691	8204	06
1115	J	5 TO 10	56	8410	8411	TPU TI TRANS OTH	156	8009	03
1115	J	5 TO 10	98	8409	8410	PSC SO WEYMOUTH	804	7912	02
1115	K	5 TO 10	62	8112	8406	LST1194 LA MOURE	450	8110	19
1115	J	5 TO 10	74	8412	8412	NAS JAX OTH	450	8112	18
1115	H	5 TO 10	117	8006	8406	NFRCREG 20/RPN	218	6904	04
1115	J	5 TO 10	93	8102	8308	CRUDIST PORTLD O	386	7805	03
1115	J	5 TO 10	75	8309	8410	CVN 70 VINSON	596	8205	02
1115	J	5 TO 10	86	8205	8409	NAVAL ACAD	216	7612	03
1115	K	5 TO 10	49	8402	8402	TPU SD TRANS OTH	384	8105	12
1115	J	5 TO 10	97	8308	8505	FASWTCPAC SD FTP	514	8112	06
1115	K	5 TO 10	63	8105	8408	AE 33 SHASTA	450	8105	19
1115	J	5 TO 10	75	8306	8408	NROTC ADUN MIT	450	7511	17
1115	J	5 TO 10	86	8202	8308	LPD 5 OGDEN	804	8006	02
1115	J	5 TO 10	99	8109	8310	NRC PORTLAND ORE	514	7806	07
1115	J	5 TO 10	97	8203	8311	CG 21 GRIDLEY	456	8202	06
1115	J	5 TO 10	98	8210	8310	CRUDIST JAX FLA	384	8102	12
1115	J	5 TO 10	[illegible]	8103	8405	NROTC PRAIRIE V	450	7803	16
1115	J	5 TO 10	[illegible]	8211	8412	FFG 14 SIDES	514	8210	06

APPENDIX C

SAS GENERATED TRANSFER PATH PERCENTAGES SAMPLE

SAS 2:26 WEDNESDAY, DECEMBER 11, 1985

TABLE OF X1 BY X2

X1 X2

FREQUENCY PERCENT ROW PCT COL PCT		A	B	C	D	TOTAL
	3423 . . .	22 . . .	1 . . .	61 . . .	517 . . .	. .
E	123 . . .	105 3.88 3.88 100.00	83 3.07 3.07 100.00	67 2.48 2.48 100.00	657 24.29 24.29 100.00	2705 100.00
TOTAL	. .	105 3.88	83 3.07	67 2.48	657 24.29	2705 100.00

(CONTINUED) TABLE OF X1 BY X2

X1 X2

FREQUENCY PERCENT ROW PCT COL PCT	E	F	G	H	TOTAL
	421 . . .	47 . . .	56 . . .	0 . . .	. .
E	1430 52.87 52.87 100.00	134 4.95 4.95 100.00	89 3.29 3.29 100.00	140 5.18 5.18 100.00	2705 100.00
TOTAL	1430 52.87	134 4.95	89 3.29	140 5.18	2705 100.00

UPDATED NODES FILE DATA

Tour	Officers	Tour	Officers	Tour	Officers	Tour	Officers
1A	0	4A	72	7A	0	10A	0
1B	0	4B	16	7B	14	10B	8
1C	0	4C	14	7C	12	10C	81
1D	0	4D	68	7D	59	10D	108
1E	1785	4E	493	7E	257	10E	244
1F	0	4F	9	7F	35	10F	18
1G	0	4G	17	7G	22	10G	35
1H	0	4H	0	7H	0	10H	0
2A	35	5A	1	8A	0	11A	0
2B	106	5B	20	8B	12	11B	23
2C	37	5C	17	8C	76	11C	91
2D	468	5D	74	8D	98	11D	134
2E	2217	5E	541	8E	173	11E	35
2F	74	5F	89	8F	44	11F	55
2G	42	5G	23	8G	38	11G	59
2H	0	5H	0	8H	0	11H	0
3A	147	6A	0	9A	0	12A	0
3B	159	6B	88	9B	16	12B	16
3C	64	6C	60	9C	123	12C	132
3D	511	6D	180	9D	107	12D	129
3E	334	6E	141	9E	91	12E	56
3F	26	6F	63	9F	40	12F	40
3G	84	6G	66	9G	39	12G	53
3H	0	6H	0	9H	0	12H	0

APPENDIX D

SEA DUTY BILLETS

TOUR	BILLETS
1E	1656
2E	1939
2F	57
3E	122
3F	20
4E	375
4F	7
5E	394
5F	68
6E	106
6F	48
7E	195
7F	27
8E	131
8F	33
9E	68
9F	0
10E	185
10F	14
11E	25
11F	42
12E	41
12F	31

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